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EXAMINER	
THOMAS, MIA M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,591	FUKUHARA, KAZUYA	
	Examiner	Art Unit	
	Mia M. Thomas	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 May 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to applicant's remarks received on 23 May 2008. By this amendment, applicant has amended claims 1, 8 and 15. Claims 1-20 remain pending in this application.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat (US 6,272,236) in combination with Hagiwara (US 5,838,433) and Hiroi et al (US 7133550).

Regarding Claim 1: (Currently amended) Pierrat teaches an inspection method for an illumination optical system of an exposure tool ("An improved technique for inspecting photomasks employs simulated images of the resist pattern." at abstract, also refer to column 1, line 7), comprising:

coating a surface of an exposure target substrate with a resist film ("The pattern is transferred to a photoresist coating on the wafer surface, forming a resist pattern." at column 1, line 32);

Hagiwara teaches placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the resist film (Refer to Figure 37; also column 27,line 65; "FIG. 37 is a perspective view of the present embodiment. FIG. 37 facilitates understanding the positional

relations among the light detecting surfaces of the sixteen photoelectric conversion elements disposed on the four pupil-conjugate planes in FIG. 31A.");

generating a plurality of inspection patterns of the resist film having a plurality of openings, by projecting exposure beams output from a plurality of effective light sources onto the resist film via the imaging components (Refer to column 30, line 56, specifically, RE: Figure 40, "Similar members to those in FIG. 31A are denoted by the same reference numerals, and the detailed description thereof is omitted herein. The objective lenses are located at positions where the direct reflected light or the direct transmitted light is not incident; for example, they are disposed at positions in plane symmetry with respect to the pattern-scribed surface of the reticle R as in the eighth embodiment."), wherein each opening corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaging components (Refer to Figure 37 and Figures 31a-d by way of example);

Hiroi teaches measuring one of the inspection patterns as a reference image, and processing the reference image so as to provide reference image data (Refer to Figure 4, also at column 4, line 17, specifically; "and an image processor circuit 10 compares the converted digital image with a reference digital image expected to be identical thereto and identifies a difference found in comparison as a candidate defect 40." at column 4,line 32); measuring inspection images of the inspection patterns, and processing the inspection images with the reference image data so as to provide a plurality of inspection image data ("A digital image of an object substrate is attained through microscopic observation thereof, the attained digital image is examined to detect defects, while masking a region pre-registered in terms of coordinates, or while masking a pattern meeting a pre-registered pattern, and an image of each of the defects thus detected is displayed." at abstract);

determining an abnormal inspection image by comparing the inspection image data with the reference image data ("When the detection position A 35 is selected in the image processor circuit 10, an image attained at the detection position A 35 is compared with an image attained at the detection position B 36, which has been stored in the memory 109. If any difference is found in the comparison, the difference is extracted as a candidate defect 40 to prepare a list of pattern defects 11." at column 10, line 36)

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Pierrat, Hagiwara and Hiroi are combinable because they are in the same field of mask inspection, specifically inspection of flaws in a semiconductor device.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to measure one of the inspection patterns as a reference image, and processing the reference image so as to provide reference image data and measure inspection images of the inspection patterns, and processing the inspection images with the reference image data so as to provide a plurality of inspection image data.

The motivation/suggestion for doing so would have been "for enabling a user to easily set up a

non-inspection region effective for a device having a complex, large pattern area to be inspected." at column 4, line 11, Hiroi.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Pierrat, Hagiwara and Hiroi to obtain the specified claimed elements of Claim 1.

4. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat (US 6,272,236) in combination with Hagiwara (US 5,838,433) and Hiroi et al (US 7133550) and further in view of Hiroi et al (US 6,373,054 B2), hereinafter Hiroi '054.

Regarding Claim 2: (Previously presented) Pierrat, Hagiwara and Hiroi teach/disclose all the claimed elements as rejected above. Pierrat, Hagiwara and Hiroi do not specifically/expressly teach the reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern.

Hiroi teaches the reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern ("From the strength (brightness) of a digital image signal correlative to the yielded secondary electrons detected by the sensor 11 in a place coinciding with the outside shape of a pattern (material A or B)..." at column 21, line 52).

Pierrat, Hagiwara, Hiroi and Hiroi '054 are combinable because they are in the same field of mask inspection, specifically inspection of flaws in a semiconductor device.

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to measure/calculate the reference image data and the inspection image data are at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern.

The motivation/suggestion for doing so would have been "to obtain a high-contrast signal representing a physical property by using electrons obtained efficient from the object making it possible to inspect a minute defect at a high speed and with high reliability." at column 1, line 58+, Hiroi.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Pierrat, Hagiwara, Hiroi and Hiroi '054 to obtain the specified claimed elements of Claim 2.

Regarding Claim 3: (Original)

Pierrat teaches wherein the abnormal inspection image occurs due to a defect including at least one of dust, a scratch in an illumination optical system which forms the effective light source, and an aberration of the illumination optical system ("Mask fabrication defects have a variety of causes. Such causes include, but are not limited to, defects in the original substrate,

introduction of particulate matter during fabrication, scratches, or improper processing. In an attempt to minimize the number of defects introduced during wafer processing, photomasks are inspected after they are created and before they are used to pattern the wafers." at column 1, line 44)

5. Claims 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat (US 6,272,236) in combination with Hagiwara (US 5,838,433) and Hiroi et al (US 7,133,550) and further in view of Hiroi (US 6,172,365) hereinafter Hiroi '365.

Regarding Claim 4 (Original): Pierrat, Hagiwara and Hiroi teach/disclose all the claimed elements as rejected above. Pierrat, Hagiwara and Hiroi do not specifically/expressly teach the imaging components are a plurality of pinholes provided in an opaque film.

Hiroi teaches the inspection method wherein the imaging components are a plurality of pinholes provided in an opaque film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film forming dry process for forming an insulator film such as an interlayer insulator film or a guard film and a wiring metal film, an etching dry process for forming an insulator film pattern having a circuit pattern and through-holes…" at column 33, line 29).

Pierrat, Hagiwara, Hiroi and Hiroi '054 are combinable because they are in the same field of mask inspection, specifically inspection of flaws in a semiconductor device.

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective

functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize imaging components which are a plurality of pinholes provided in an opaque film.

The motivation/suggestion for doing so would have been "to obtain a high-contrast signal representing a physical property by using electrons obtained efficient from the object making it possible to inspect a minute defect at a high speed and with high reliability." at column 1, line 58+, Hiroi.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Pierrat, Hagiwara, Hiroi and Hiroi '054 to obtain the specified claimed elements of Claim 4.

Regarding Claim 6 (Original): Hiroi teaches wherein the pinholes implement a diffraction grating having a translucent film and a transparent portion arranged in a grid pattern (Refer to Figure 16, numeral 48 and 49; "...a potential providing device 19 such as a grid disposed between the objective lens 18 and the wafer (object) 20, a wafer holder 21 for holding the wafer 20 mounted thereon..." at column 24, line 67).

Regarding Claim 7 (Original): Hagiwara teaches the reference image data and the inspection image data further include a variation of a center position between at least one of the inspection patterns formed by a zeroth-order diffraction beam (Refer to Figures 3a and 3b, also at column

7, line 58) of the diffraction grating and an outer edge formed by a plurality of first-order diffraction beams, and a size of the outer edge (Refer to column 8, line 27).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat (US 6,272,236) in combination with Hagiwara (US 5,838,433) and Hiroi et al (US 7133550) and further in view of Schulze et al. (US 7,221,788 B2).

Regarding Claim 5: Pierrat, Hagiwara and Hiroi teach/disclose all the claimed elements as rejected above. Pierrat, Hagiwara and Hiroi do not specifically/expressly teach imaging components are a plurality of lenses in a lens.

Schulze teaches the imaging components are a plurality of lenses in a lens array ("To record an image of the pattern formed on the mask, the mask is irradiated with light from one side and an image of the light transmitted through the mask is recorded using a sensor mounted on the other side. A lens projection system is used to yield a sharp image." at column 9, line 57).

Pierrat, Hagiwara, Hiroi and Schulze are combinable because they are in the same field of semiconductor defect detection.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to provide a plurality of lenses in a lens array as the imaging components for this invention.

The suggestion/motivation for doing so would have been to create a more efficient defect inspection tool. Utilizing a plurality of imaging components would create multiple positions to calculate and determine artifact and defects in an inspection method/technique. Further at column 9, line 60, Schulze discloses that the use of a plurality of lenses in a lens array yields a sharper image. The sharper image would thus make the results of the mask inspection more effective and useful.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Hiroi, Hagiwara and Schulze to obtain the specified claimed elements of Claim 5.

7. Claims 8-11,13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 6,222,195 B1) in combination with Noguchi et al. (US 6,016,187) and further in view of Hagiwara (US 5,838,433).

Regarding Claim 8. (Currently amended) Yamada discloses a processor for inspecting an illumination optical system of an exposure tool (Refer to Figure 1; "A method of detecting deficiency of an aperture used in a charged-particle-beam exposure process employing at least two exposure columns is disclosed..." at abstract),
a data input module configured to acquire a reference image and inspection images of a plurality of inspection patterns of a resist film having a plurality of openings a data input module (Refer to Figure 1, numeral 152 via numeral 160; also Refer to Figures 2a and 2b, Figure 2a resembling the acquisition of the image and Figure 2b, resembling the reference image and inspection image with a plurality of inspection patterns);

Noguchi teaches the inspection patterns (By way of example, refer to Figures 15a, and 15b, further at column 10, lines 53-60) obtained by projecting exposure beams output from a plurality of effective light sources (Refer to Figure 4 and Figure 5) onto the resist film coated on a surface of an exposure target substrate (Refer to Figure 4, numeral 200) by a plurality of imaging components (Refer to Figure 4, numeral 3000).

the imaging components placed so as to deviate from an optical conjugate plane of the surface of the resist film (Refer to Figure 7, specifically, numeral 26 and Figures 3a and 3b)

an image processing module configured to calculate reference image data and inspection image data from the reference image and the inspection images, respectively (Refer to Figure 4); and a determination module configured to compare the inspection image data with the reference image data, so as to determine whether the inspection image data is abnormal (Refer to Figure 4, numeral S4-S7).

Hagiwara teaches wherein each opening corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaging components (Refer to Figure 37 and Figures 31a-d by way of example); the imaging components placed so as to deviate from an optical conjugate plane of the surface of the resist film (Refer to Figure 37; also column 27,line 65; "FIG. 37 is a perspective view of the present embodiment. FIG. 37 facilitates understanding the positional relations among the light detecting surfaces of the sixteen photoelectric conversion elements disposed on the four pupil-conjugate planes in FIG. 31A.");

Yamada, Noguchi and Hagiwara are combinable because they are in the same field of exposure apparatus' and methods. (See the title of each invention).

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art wherein each opening (in the inspection pattern) corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaging components.

The suggestion/motivation for doing so would have been to provide "a mask defect inspection apparatus that can detect a microscopic mask defect existing on a mask." (at column 1, line 22, Hagiwara).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Noguchi, Yamada and Hagiwara to produce the specified claimed elements of Claim 8.

Regarding Claim 9: (Previously presented) Yamada teaches the reference image data and the inspection image data include at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern ("The exposure-column unit 110 further includes a first slit 115 shaping the electron beam rectangular, a first lens 116 converging the shaped beam, and a slit deflector 117 deflecting a position of the shaped beam on a block mask 120 based on a deflection signal S1." at column 1, line 45).

Regarding Claim 10: (Original) Yamada teaches the abnormal inspection image being due to a defect including at least one of dust, a scratch in an illumination optical system ("A difference between the two waveforms indicates that either one of the mask patterns 13A or 13B has a defect. In this case, it is possible to rely on a visual inspection to determine which one of the mask patterns 13A and 13B has the defect." at column 12, line 23) which forms the effective light source, and an aberration of the illumination optical system ("A subsequent inspection after the replacement of one of the masks will be repeated until no difference is detected between the two signal waveforms." at column 12, line 30).

Regarding Claim 11: (Original) Yamada teaches wherein the imaging components are a plurality of pinholes provided in an opaque film (Refer to Figures 10a and 10b; "For the pattern inspection of this embodiment, a glass board coated with a thin metal layer (e.g., Cr wafer) is preferably used, and a pattern is transferred onto the metal layer by etching. This is because a sharper pattern than a resist pattern can be formed on the metal layer on the glass board to achieve more reliable inspection by using the comparison-inspection device." at column 16, line 59).

Regarding Claim 13: (Original) Yamada discloses the pinholes configure a diffraction grating having a translucent film and a transparent portion arranged in a grid pattern (Refer to Figure 6, S11-S19, specifically, numeral S13).

Regarding Claim 14: (Original) Yamada teaches reference image data and the inspection image data further include a variation of a center position between at least one of the inspection patterns formed by a zeroth-order diffraction beam of the diffraction grating and an outer edge

formed by a plurality of first-order diffraction beams, and a size of the outer edge (Refer to Figure 6, numeral S16).

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 6,222,195 B1) in combination with Noguchi et al. (US 6,016,187) and Hagiwara (US 5,838,433) and further in view of Schulze et al. (US 7,221,788 B2).

Regarding Claim 12: (Original) Yamada, Noguchi and Hagiwara in combination teach/disclose all the claimed elements as rejected above. Yamada, Noguchi and Hagiwara in combination does not specifically/expressly teach imaging components are a plurality of lenses in a lens.

Schulze teaches the imaging components are a plurality of lenses in a lens array ("To record an image of the pattern formed on the mask, the mask is irradiated with light from one side and an image of the light transmitted through the mask is recorded using a sensor mounted on the other side. A lens projection system is used to yield a sharp image." at column 9, line 57).

Yamada, Noguchi and Hagiwara and Schulze are combinable because they are in the same field of semiconductor defect detection.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to provide a plurality of lenses in a lens array as the imaging components for this invention.

The suggestion/motivation for doing so would have been to create a more efficient defect inspection tool. Utilizing a plurality of imaging components would create multiple positions to calculate and determine artifact and defects in an inspection method/technique. Further at column 9, line 60, Schulze discloses that the use of a plurality of lenses in a lens array yields a sharper image. The sharper image would thus make the results of the mask inspection more effective and useful.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Hiroi, Hagiwara and Schulze to obtain the specified claimed elements of Claim 12.

9. Claims 15-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroi (6,172,365 B1) in combination with Hagiwara (US 5,838,433).

Regarding Claim 15. (Currently amended) Hiroi discloses a method for manufacturing a semiconductor device ("The present invention relates to a method ... for obtaining an image or a waveform representing a physical property of an object such as a semiconductor wafer with an electron beam..." at column 1, line 15) comprising:

executing an inspection processing of an exposure tool ("...an object of the present invention is to provide an electron beam inspection method, and apparatus..." at column 1, line 52)

coating a surface of an inspection target substrate with an inspection resist film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film..." at column 33, line 29);

measuring one of the inspection patterns as a reference image (Refer to Figure 4a), and processing the reference image so as to provide reference image data (Refer to Figure 13, numeral 25); and determining an abnormal inspection image by measuring inspection images of the inspection patterns (Refer to Figure 4b) and comparing a plurality of inspection image data provided by processing the inspection images with the reference image data (Refer to Figures 4b and 4c, also Figure 23, numeral 53); correcting the exposure tool by acquiring a type of defect from the abnormal inspection image when the abnormal inspection image is determined to occur (Refer Figure 13, numeral 27); coating a semiconductor substrate with a manufacturing resist film (Refer to Figure 14a-14c; "A semiconductor is fabricated on a semiconductor substrate (wafer) via a film..." at column 33, line 29); loading a manufacturing photomask and the semiconductor substrate to the exposure tool (Refer to Figure 14a, numeral 31a; Figure 14b, numeral 31b, by way of example and subjecting the semiconductor substrate to a manufacturing process of a semiconductor device by delineating the manufacturing resist film using the manufacturing photomask (Refer to Figure 18).

Hiroi does not specifically teach wherein each opening (in the inspection pattern)corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaginq components.

Hagiwara teaches placing a plurality of imaging components deviating from an optical conjugate plane of a surface of the inspection resist film;(Refer to Figure 37; also column 27,line 65; "FIG. 37 is a perspective view of the present embodiment. FIG. 37 facilitates understanding the

positional relations among the light detecting surfaces of the sixteen photoelectric conversion elements disposed on the four pupil-conjugate planes in FIG. 31A.");

generating a plurality of inspection patterns of the inspection resist film having a plurality of openings (Refer to column 1, line 6), by projecting exposure beams output from a plurality of effective light sources onto the inspection resist film via the imaging components (Refer to column 1, lines 28-62) wherein each opening corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaging components (Refer to Figure 37 and Figures 31a-d by way of example); the imaging components placed so as to deviate from an optical conjugate plane of the surface of the resist film (Refer to Figure 37; also column 27,line 65; "FIG. 37 is a perspective view of the present embodiment. FIG. 37 facilitates understanding the positional relations among the light detecting surfaces of the sixteen photoelectric conversion elements disposed on the four pupil-conjugate planes in FIG. 31A.");

Hiroi and Hagiwara are combinable because they are in the same field of semiconductor manufacturing inspection and exposure tools inspection. (See title and abstract of both inventions).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art wherein each opening (in the inspection pattern) corresponds to one of the effective light sources, and each inspection pattern corresponds to one of the imaging components.

The suggestion/motivation for doing so would have been to provide "a mask defect inspection apparatus that can detect a microscopic mask defect existing on a mask." (at column 1, line 22, Hagiwara)

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings/disclosures of Hiroi and Hagiwara to obtain the specified claimed elements of Claim 15.

Regarding Claim 16. (Previously presented) Hiroi teaches the reference image data and the inspection image data include at least one of a brightness of the inspection image of the inspection pattern and a shape of the inspection pattern("From the strength (brightness) of a digital image signal correlative to the yielded secondary electrons detected by the sensor 11 in a place coinciding with the outside shape of a pattern (material A or B)..." at column 21, line 52).

Regarding Claim 17. (Original) Hiroi teaches the abnormal inspection image being due to a defect including at least one of dust, a scratch in an illumination optical system which forms the effective light source, and an aberration of the illumination optical system (Refer to Figure 4b, "Image With Defect Appearing Small").

Regarding Claim 18. (Original) Hiroi teaches the imaging components are a plurality of pinholes provided in an opaque film ("A semiconductor is fabricated on a semiconductor substrate (wafer) via a film forming dry process for forming an insulator film such as an interlayer insulator film or a guard film and a wiring metal film, an etching dry process for forming an insulator film pattern having a circuit pattern and through-holes..." at column 33, line 29).

Regarding Claim 20. (Original) Hiroi teaches the pinholes implement a diffraction grating

having a translucent film and a transparent portion arranged in a grid pattern(Refer to Figure 16, numeral 48 and 49; "...a potential providing device 19 such as a grid disposed between the objective lens 18 and the wafer (object) 20, a wafer holder 21 for holding the wafer 20 mounted thereon..." at column 24, line 67).

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroi (6,172,365 B1) in combination with Hagiwara (US 5,838,433) and further in view of Schulze et al. (US 7,221,788 B2).

Regarding Claim 19:

Hiroi and Hagiwara in combination discloses/teaches all the claimed elements as rejected above. However, the combination of Hiroi and Hagiwara does not specifically teach imaging components are a plurality of lenses in a lens.

Schulze teaches the imaging components are a plurality of lenses in a lens array ("To record an image of the pattern formed on the mask, the mask is irradiated with light from one side and an image of the light transmitted through the mask is recorded using a sensor mounted on the other side. A lens projection system is used to yield a sharp image." at column 9, line 57).

Hiroi, Hagiwara and Schulze are combinable because they are in the same field of semiconductor defect detection.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to provide a plurality of lenses in a lens array as the imaging components for this invention.

The suggestion/motivation for doing so would have been to create a more efficient defect inspection tool. Utilizing a plurality of imaging components would create multiple positions to calculate and determine artifact and defects in an inspection method/technique. Further at column 9, line 60. Schulze discloses that the use of a plurality of lenses in a lens array yields a sharper image. The sharper image would thus make the results of the mask inspection more effective and useful.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Hiroi, Hagiwara and Schulze to obtain the specified claimed elements of Claim 19.

Response to Arguments

11. Applicant's arguments, see page 9, with respect to 35 USC 112, second paragraph rejections, after careful review the rejection regarding paragraph 7.34.07 has been fully considered and are persuasive. The rejection under 112, second paragraph has been withdrawn.

12. Applicant's arguments, see page 9, with respect to 35 USC 112, second paragraph rejections, have been fully considered and are persuasive. The rejection of based upon indefiniteness has been withdrawn.

13. Applicant's arguments with respect to claims 8-14 (pages 10), 15-18, 20 (page 13), 19 (page 15), 1 (page 16), 2-4, 6 and 7 (page 18), 5 (page 19) have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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